

APPENDIX 2

Study	Outcome	Muscle Group	Group	Pre			Post		
				Mean	DP	n	Mean	DP	n
Mackenzie et al., 2010	Isometric torque at 90° (N.m)*	Elbow flexors	Control	133	22	23	133	21	20
			Trained	126	18	23	133	17	20
		Elbow extensors	Control	100	15	23	105	16	20
			Trained	97	14	23	106	16	20
	RMS agonist muscle activation during MIVC (μV)*	Elbow flexors	Control	275	135	23	276	146	19
			Trained	32	189	23	383	245	19
		Elbow extensors	Control	194	67	23	184	71	19
			Trained	166	52	23	197	58	19
	RMS agonist muscle activation during cocontraction (μV)	Elbow flexors	Control	135	92	23	147	88	19
			Trained	150	104	23	195	133	19
		Elbow extensors	Control	108	74	23	109	66	19
			Trained	90	54	23	145	61	19
Driss et al., 2014	Isometric force at 90° (N)*	Elbow flexors	Control	269	52	10	272	48	10
			Trained	286	45	10	312	47	10
		Elbow extensors	Control	189	33	10	195	37	10
			Trained	207	38	10	234	40	10
	Antagonist cocontraction strength during agonist contraction (N)	Elbow flexors	Control	36.9	30.3	10	32.7	23.8	10
			Trained	18.6	7.8	10	22.4	8.2	10
		Elbow extensors	Control	43.4	21.6	10	48.8	23.7	10
			Trained	36.3	15.2	10	34.7	15.2	10
	Corrected maximal strength (N)	Elbow flexors	Control	312	64	10	321	65	10
			Trained	322	51	10	346	54	10
		Elbow extensors	Control	226	55	10	228	54	10
			Trained	225	34	10	257	39	10
	RMS agonist muscle activation during MIVC (μV)*	Elbow flexors	Control	570	362	10	604	364	10
			Trained	664	308	10	692	160	10
		Elbow extensors	Control	336	94	10	376	196	10
			Trained	413	176	10	550	240	10

Study	Outcome	Muscle Group	Group	Pre			Post		
				Mean	DP	n	Mean	DP	n
Driss et al., 2014 (Continued)	Antagonist coactivation during agonist MIVC (%EMGmax)*	Elbow flexors	Control	11.4	8.2	10	9.8	5.9	10
			Trained	6.1	3.7	10	6.7	3	10
		Elbow extensors	Control	18.7	7.1	10	20.7	7.6	10
			Trained	16.2	6.9	10	13.6	5.5	10
Maeo et al., 2014 Neuro-muscular adaptations	Isometric torque at 90° (N.m)*(e)	Elbow flexors	Control	58.23	7.64	7	57.64	5.88	7
			Trained	53.52	8.82	9	61.17	8.23	9
		Elbow extensors	Control	38.82	9.41	7	38.23	5.88	7
			Trained	35.29	10.58	9	51.76	12.35	9
	Muscle thickness (mm)*(e)	Elbow flexors	Control	33.78	1.78	7	33.85	2.35	7
			Trained	33.28	3.42	9	34.5	03.07	9
		Elbow extensors	Control	34.85	3.42	7	34.85	3.57	7
			Trained	33.57	3.92	9	34.78	4.14	9
	RMS agonist muscle activation during MIVC (mV)*(e)	Elbow flexors	Control	01.01	0.15	7	0.91	0.26	7
			Trained	0.87	0.31	9	1.26	0.46	9
		Elbow extensors	Control	0.57	0.19	7	0.58	0.25	7
			Trained	0.58	0.34	9	0.82	0.36	9
	RMS antagonist coactivation during MIVC (mV) (e)	Elbow flexors	Control	10.14	5.14	7	9.42	3.85	7
			Trained	9.71	6.57	9	10.85	6.28	9
		Elbow extensors	Control	12.85	5.28	7	13	6	7
			Trained	11.71	6.71	9	10.14	7.71	9
Maeo et al., 2014 Effect of short-term	Isometric torque at 90° (N.m)*(e)	Elbow flexors	Control	59.25	6.75	10	57.25	9	10
			Trained	56.25	6.75	13	63.5	6.75	13
		Elbow extensors	Control	39.5	8.25	10	38.75	7	10
			Trained	42	10.75	13	48	13.75	13
	Antagonist isometric torque during agonist isometric MIVC (N.m)	Elbow flexors	Control	16.9	6.5	10	17.4	6.7	10
			Trained	12.3	5.7	13	14.8	5.9	13
		Elbow extensors	Control	10.9	3.3	10	10.3	3.7	10
			Trained	8.5	5.4	13	11.5	7.4	13

Study	Outcome	Muscle Group	Group	Pre			Post		
				Mean	DP	n	Mean	DP	n
Maeo et al., 2014 Effect of short-term (Continued)	Concentric isokinetic torque 30°/s (N.m)(e)	Elbow flexors	Control	27.71	3.15	10	29.82	3.5	10
			Trained	21.05	4.91	13	26.31	3.15	13
		Elbow extensors	Control	31.93	3.86	10	33.33	5.61	10
			Trained	28.42	4.91	13	34.73	6.66	13
	Concentric isokinetic torque 60°/s (N.m)(e)	Elbow flexors	Control	38.94	3.5	10	38.94	3.5	10
			Trained	30.52	4.21	13	34.03	3.86	13
		Elbow extensors	Control	39.29	5.61	10	38.24	5.96	10
			Trained	35.78	5.61	13	42.45	6.31	13
	Concentric isokinetic torque 120°/s (N.m)(e)	Elbow flexors	Control	42.45	5.61	10	44.21	5.26	10
			Trained	35.78	4.56	13	39.29	4.21	13
		Elbow extensors	Control	46.66	7.71	10	46.66	7.36	10
			Trained	38.94	5.96	13	45.61	07.01	13
	Concentric isokinetic torque 240°/s (N.m)(e)	Elbow flexors	Control	45.61	5.61	10	44.56	5.26	10
			Trained	37.89	4.21	13	39.29	4.91	13
		Elbow extensors	Control	49.47	10.17	10	49.47	6.31	10
			Trained	43.5	07.01	13	50.52	5.61	13
	Eccentric isokinetic torque 30°/s (N.m)(e)	Elbow flexors	Control	57.89	7.36	10	56.84	4.56	10
			Trained	51.93	7.71	13	54.38	7.71	13
		Elbow extensors	Control	56.49	08.07	10	54.38	7.71	10
			Trained	53.68	8.77	13	58.59	9.12	13
	Eccentric isokinetic torque 60°/s (N.m)(e)	Elbow flexors	Control	59.29	7.71	10	56.49	7.71	10
			Trained	53.68	07.01	13	56.84	11.93	13
		Elbow extensors	Control	54.73	7.71	10	54.73	5.96	10
			Trained	52.98	6.66	13	56.14	7.71	13
	Eccentric isokinetic torque 120°/s (N.m)(e)	Elbow flexors	Control	57.54	4.91	10	57.54	5.96	10
			Trained	52.63	08.07	13	56.84	11.22	13
		Elbow extensors	Control	55.08	08.07	10	52.63	4.56	10
			Trained	51.22	5.26	13	56.49	8.42	13

Study	Outcome	Muscle Group	Group	Pre			Post		
				Mean	DP	n	Mean	DP	n
Maeo et al., 2014 Effect of short-term (Continued)	Muscle thickness (mm)*	Elbow flexors	Control	34	2.2	10	33.9	2.2	10
			Trained	32.7	3.5	13	33	3.5	13
		Elbow extensors	Control	34.3	3	10	34.2	3.1	10
			Trained	32.2	5	13	32.5	4.8	13
	RMS agonist muscle activation during MIVC (mV)*(e)	Elbow flexors	Control	01.05	0.44	10	01.01	0.37	10
			Trained	01.05	0.47	13	1.27	0.56	13
		Elbow extensors	Control	0.61	0.18	10	0.57	0.15	10
			Trained	0.69	0.4	13	0.86	0.44	13
	Antagonist coactivation during agonist MIVC (%EMGmax)*	Elbow flexors	Control	12.8	5	10	12.4	4.7	10
			Trained	11.9	5.8	13	9.9	4.9	13
		Elbow extensors	Control	10	5.1	10	11.4	5.2	10
			Trained	9.2	5.8	13	9.9	5.2	13
	Muscle torque on submaximal test at 90° - 5% (e)	Elbow flexors	Control	2.85	NI	10	2.85	NI	10
			Trained	3.21	NI	13	3.21	NI	13
		Elbow extensors	Control	2.25	NI	10	2.25	NI	10
			Trained	2.25	NI	13	2.25	NI	13
	Muscle torque on submaximal test at 90° - 10% (e)	Elbow flexors	Control	7.85	NI	10	5.35	NI	10
			Trained	5.71	NI	13	5.71	NI	13
		Elbow extensors	Control	4.19	NI	10	4.19	NI	10
			Trained	4.51	NI	13	4.51	NI	13
	Muscle torque on submaximal test at 90° - 30% (e)	Elbow flexors	Control	17.85	NI	10	17.5	1.42	10
			Trained	16.78	01.07	13	18.21	1.42	13
		Elbow extensors	Control	11.93	1.61	10	12.25	0.96	10
			Trained	13.22	2.25	13	13.87	3.54	13
	Muscle torque on submaximal test at 90° - 50% (e)	Elbow flexors	Control	29.28	1.78	10	28.21	3.21	10
			Trained	27.14	2.14	13	30.71	3.21	13
		Elbow extensors	Control	20.64	2.58	10	20	2.25	10
			Trained	21.61	4.51	13	22.58	6.12	13

Study	Outcome	Muscle Group	Group	Pre			Post		
				Mean	DP	n	Mean	DP	n
Maeo et al., 2014 Effect of short-term (Continued)	Muscle torque on submaximal test at 90° - 70% (e)	Elbow flexors	Control	40.71	3.57	10	39.28	5	10
			Trained	38.92	3.57	13	42.85	3.92	13
		Elbow extensors	Control	28.38	4.51	10	27.74	3.54	10
			Trained	30	6.12	13	31.61	10	13
	Muscle torque on submaximal test at 90° - 100% (e)	Elbow flexors	Control	58.92	5	10	57.14	7.14	10
			Trained	55.71	5	13	63.21	5.35	13
		Elbow extensors	Control	41.29	07.09	10	40.32	5.8	10
			Trained	42.25	9.35	13	48.06	12.25	13
	Muscle activation on submaximal test at 90° - 5% (e)	Elbow flexors	Control	0.01	NI	10	0.01	NI	10
			Trained	0.01	NI	13	0.01	NI	13
		Elbow extensors	Control	0.01	NI	10	0.01	NI	10
			Trained	0.02	NI	13	0.02	NI	13
	Muscle activation on submaximal test at 90° - 10% (e)	Elbow flexors	Control	0.02	NI	10	0.02	NI	10
			Trained	0.03	NI	13	0.03	NI	13
		Elbow extensors	Control	0.02	NI	10	0.02	NI	10
			Trained	0.04	0.01	13	0.04	0.01	13
	Muscle activation on submaximal test at 90° - 30% (e)	Elbow flexors	Control	0.12	0.03	10	0.1	0.02	10
			Trained	0.14	0.05	13	0.16	0.05	13
		Elbow extensors	Control	0.09	0.03	10	0.08	0.02	10
			Trained	0.12	0.05	13	0.14	0.06	13
	Muscle activation on submaximal test at 90° - 50% (e)	Elbow flexors	Control	0.26	0.05	10	0.26	0.07	10
			Trained	0.36	0.18	13	0.4	0.16	13
		Elbow extensors	Control	0.18	0.06	10	0.15	0.03	10
			Trained	0.23	0.12	13	0.26	0.13	13
	Muscle activation on submaximal test at 90° - 70% (e)	Elbow flexors	Control	0.48	0.17	10	0.48	0.09	10
			Trained	0.59	0.23	13	0.67	0.33	13
		Elbow extensors	Control	0.3	0.11	10	0.29	0.08	10
			Trained	0.36	0.17	13	0.43	0.19	13

Study	Outcome	Muscle Group	Group	Pre			Post		
				Mean	DP	n	Mean	DP	n
Maeo et al., 2014 Effect of short-term (Continued)	Muscle activation on submaximal test at 90° - 100% (e)	Elbow flexors	Control	01.02	0.41	10	0.99	0.35	10
			Trained	01.03	0.45	13	1.24	0.53	13
		Elbow extensors	Control	0.62	0.17	10	0.59	0.15	10
			Trained	0.68	0.39	13	0.86	0.42	13
	RMS muscle activation during cocontraction (% EMGmax)	Elbow flexors	Control	NI	NI	10	NI	NI	10
			Trained	40.6%	13.6%	13	NI	NI	13
		Elbow extensors	Control	NI	NI	10	NI	NI	10
			Trained	60.2%	14.7%	13	NI	NI	13
Counts et al., 2016	Isometric torque at 90° (N.m)	Elbow flexors	No load	NI	NI	15	NI	NI	13
	Concentric isometric torque 60°/s (N.m)*	Elbow flexors	No load	40	17.3	15	40.8	16	13
	Concentric isometric torque 180°/s (N.m)	Elbow flexors	No load	34.3	12.8	15	34.4	14	13
	Muscle thickness - 50% of the distance between the acromion process of the scapula and to the lateral epicondyle to the humerus (cm) (e)	Elbow flexors	No load	2.60	0.79	15	2.80	0.68	13
	Muscle thickness - 60% of the distance between the acromion process of the scapula and to the lateral epicondyle to the humerus (cm) *(e)	Elbow flexors	No load	2.89	0.69	15	03.00	0.68	13
	Muscle thickness - 70% of the distance between the acromion process of the scapula and to the lateral epicondyle to the humerus (cm) (e)	Elbow flexors	No load	3.19	0.69	15	3.47	0.68	13
	Muscle thickness - 50% of the distance between the acromion process of the scapula and to the lateral epicondyle to the humerus (cm) (e)	Elbow extensors	No load	3.20	0.51	15	3.29	0.68	13
	Muscle thickness - 60% of the distance between the acromion process of the scapula and to the lateral epicondyle to the humerus (cm) *(e)	Elbow extensors	No load	2.59	0.43	15	2.68	0.60	13
	Muscle thickness - 70% of the distance between the acromion process of the scapula and to the lateral epicondyle to the humerus (cm) (e)	Elbow extensors	No load	2.17	0.42	15	2.17	0.34	13

Study	Outcome	Muscle Group	Group	Pre			Post		
				Mean	DP	n	Mean	DP	n
Zbidi et al., 2016	Isometric force at 90° (N)* (e)	Elbow flexors	Trained	281.42	16.76	20	304.21	16.93	20
		Elbow extensors	Trained	229.26	13.23	20	255.45	14.54	20
Zbidi et al., 2017	Isometric force at 90° (N)* (e)	Elbow flexors	Trained	276.74	11.62	16	309.3	9.3	16
		Elbow extensors	Trained	211.62	9.3	16	259.3	11.62	16
	Antagonist isometric force during agonist isometric MIVC (N)	Elbow flexors	Trained	22.6	3.5	16	21.5	3.2	16
		Elbow extensors	Trained	39	10.8	16	39.8	9.9	16
	iEMG muscle activity during MIVC (mV) (e)	Elbow flexors	Trained	626.47	17.64	16	811.76	35.29	16
		Elbow extensors	Trained	476.47	11.76	16	611.76	23.52	16
	iEMG of antagonist coactivation during agonist MIVC (mV) (e)	Elbow flexors	Trained	10.14	0.58	16	9.7	0.58	16
		Elbow extensors	Trained	18.82	0.88	16	18.38	0.88	16
	iEMG during cocontraction	Elbow flexors	Trained	NI	NI	16	NI	NI	16
		Elbow extensors	Trained	NI	NI	16	NI	NI	16
	EMG during submaximal test (30 to 60% of MIVC)	Elbow flexors	Trained	NI	NI	16	NI	NI	16
		Elbow extensors	Trained	NI	NI	16	NI	NI	16

* Included on quantitative synthesis; (e) Estimate values; MIVC: Maximal isometric voluntary contraction; NI: not informed and not possible to estimate; iEMG: EMG integrated.